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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 20

Application Number: 09/186,388
Filing Date: November 05, 1998
Appellant(s): LEE ET AL.

For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed March 5, 2002.

(1) *Real Party in Interest*

A statement identifying the real party in interest is contained in the brief.

(2) *Related Appeals and Interferences*

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) *Status of Claims*

The statement of the status of the claims contained in the brief is correct.

(4) *Status of Amendments After Final*

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) *Summary of Invention*

The summary of invention contained in the brief is correct.

(6) *Issues*

The appellant's statement of the issues in the brief is correct.

(7) *Grouping of Claims*

Appellant's brief includes a statement that claims 1-28 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) *Claims Appealed*

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

5,155,369	CURRENT	10-1992
4,578,589	AITKEN	3-1986

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Current (U.S. Pat. 5,155,369) in view of Aitken (U.S. Pat. 4,578,589), as previously applied.

Current teaches a method of forming source/drain regions, comprising the steps of providing a semiconductor integrated circuit wafer having a gate electrode and source/drain regions, providing an ion implant apparatus which is the Precision Implant 9200 from Applied Materials, adjusting the ion implant apparatus so that the ion implant apparatus produces an ion beam comprising P_2^+ or As_2^+ ions, wherein the ion beam has a beam density and a beam energy, implanting P_2^+ or As_2^+ ions into the gate electrode and the source/drain regions of the integrated circuit wafer in a single step using the ion implant beam, and annealing the integrated circuit wafer having the

P_2^+ or As_2^+ ions implanted at an anneal temperature for an anneal time; wherein the adjusting the ion implant apparatus so that the ion implant apparatus produces an ion beam comprising one of P_2^+ or As_2^+ ions using a magnetic analyzer; wherein the beam density is between about 10^{14} and 10^{15} ions/cm^2 and the beam energy is 20 or 50 KeV; the anneal temperature is between about 900 and 1100°C; the anneal time is between 1 and 30 seconds, wherein a typical gate electrode comprises an oxide layer on top of which is a polysilicon layer (col. 1, ll. 42-45).

Current teaches all the limitations in the claims with the exception of placing a phosphorus or arsenic ion source in the ion implant apparatus, wherein the phosphorus ion source and the arsenic ion source comprises solid phosphorus and solid arsenic, respectively.

Aitken teaches an apparatus for ion implantation such as the one used in Current that comprises a solid arsenic and a solid phosphorus ion sources, and placing the ion source in the ion implant apparatus.

Thus, it would have been obvious to one of ordinary skill in the art to use a solid arsenic ion source or a solid phosphorus ion source in the ion implant apparatus as taught by Aitken in the invention of Current, as it is shows that it is well known and desirable in the art to the possibility of using a solid ion source in the apparatus used by Current in his invention and to vary the ranges for the beam density, beam energy, and anneal time as the values taught in Current encompass those of the claims, and it would not yield any unexpected results.

(11) Response to Argument

The method essentially comprises an implantation method for a semiconductor device, the method includes the implantation of P_2^+ or As_2^+into source/drain regions or a polysilicon electrode, wherein the P_2^+ or As_2^+species is implanted in a single ion implantation step.

Appellant primarily argues that Current teaches a two step ion implantation method while claims 1-28 describe a single step ion implantation method.

With respect to Applicant's argument that Current do not disclose a single ion implantation step, it is noted that in Col. 8, at the top, Current teaches a single implantation step of P_2^+ or As_2^+, followed by an implantation of another species, the claims comprise an ion implantation of one species, the P_2^+ or As_2^+, but the scope of the claim does not preclude the implantation of a second species, therefore it would have been within the scope of one of ordinary skill in the art to implant the P_2^+ or As_2^+ in one single step followed by an implantation of another species as long as the integrity of the device is preserved.

Furthermore, the claim language still does not preclude the introduction of additional species as the claim language relates to a process comprising the steps and not exclusively consisting of the steps recited in the claims.

With respect to applicant's argument that the actual source drain implantations of Current uses P^- or As^- ions, it is noted that the first implantation, in which one of P_2^+

or As_2^+ is used, regions 64 and 65 that correspond to source and drain regions are formed.

With respect to Applicant's argument that the claims are separately patentable as claims 1-14 are directed to source-drain regions and claims 15-28 are directed to polysilicon electrodes, and that the requirements for doping the polysilicon electrodes are different to the doping for the source/drain regions, it is noted that the claims in both the doping of the polysilicon electrodes and the source/drain regions include the conditions of a beam density of $4x10^{14}$ and $6x10^{14}$ ions/cm^2 and a beam energy between 20 and 48 KeV, thus the ranges are similar and similar doping characteristics are used for the polysilicon electrodes and the source/drain regions, furthermore Current references teaches the doping of the polysilicon electrode and the source/drain regions using beam densities between about 10^{14} and 10^{15} ions/cm^2 and a beam energy between 20 and 50 KeV, thus the ranges included in the claims are contained in the range of Current and furthermore, the use of the same ranges for the doping of the polysilicon electrode and the source/drain region by the Applicant does not make a distinction between the doping methods as the Applicant argues that the two methods are separately patentable due to the requirements of doping being different.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Ginette Peralta
April 19, 2002

Appeal conference held on April 11, 2002

Conferees

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